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EXAMINER

NGUYEN, KIET TUAN

ART UNIT PAPER NUMBER

2881

DATE MAILED: 03/31/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/502,120

Applicant(s)

Meisburger et al.

Examiner

K. ALUYEN

Group Art Unit

2881

— The MAILING DATE of this communication appears on the cover sheet beneath the correspondence address —

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, such period shall, by default, expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

☒ Responsive to communication(s) filed on 04-16-02

☒ This action is **FINAL**.

☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

## Disposition of Claims

☒ Claim(s) 9-27 and 29-51 is/are pending in the application.

Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.

☐ Claim(s) \_\_\_\_\_ is/are allowed.

☒ Claim(s) 9-27 and 29-51 is/are rejected.

☐ Claim(s) \_\_\_\_\_ is/are objected to.

☐ Claim(s) \_\_\_\_\_ are subject to restriction or election requirement

## Application Papers

☐ The proposed drawing correction, filed on \_\_\_\_\_ is ☐ approved ☐ disapproved.

☐ The drawing(s) filed on \_\_\_\_\_ is/are objected to by the Examiner

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. § 119 (a)-(d)

☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119 (a)-(d).

☐ All ☐ Some\* ☐ None of the:

☐ Certified copies of the priority documents have been received.

☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_

☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a))

\*Certified copies not received: \_\_\_\_\_

## Attachment(s)

☒ Information Disclosure Statement(s), PTO-1449, Paper No(s). 16

☐ Interview Summary, PTO-413

☐ Notice of Reference(s) Cited, PTO-892

☐ Notice of Informal Patent Application, PTO-152

☐ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Other \_\_\_\_\_

Office Action Summary

1) This reissue application was filed without the required offer to surrender the original patent or, if the original is lost or inaccessible, an affidavit or declaration to that effect. The original patent, or an affidavit or declaration as to loss or inaccessibility of the original patent, must be received before this reissue application can be allowed. See 37 CFR 1.178.

2) ***Objected Informalities***

The disclosure is objected to because of the following informalities:

**In The Claims**

Claim 44, line 8, "and" should be deleted.

Appropriate correction is required.

3) ***Objected Drawings***

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, an electric field perpendicular to a surface of the structure as recited in claims 9 and 21; the electron beam flooding an area of the structure as recited in claims 12 and 36-37; a focused electron beam as recited in claim 13; a plate for positioning the structure and the voltage applied to the plate as recited in claims 15 and 27; the means for obtaining the voltage contrast data in the form of an image as recited in claim 18; means for controlling the temperature of the structure during the test as recited in claim 20; means for applying charge to an element of the structure as recited in claim 21; the grid electrode as recited in claim 25; the electrode grounded as recited in claim 29; the electrode voltage varied as recited in claim 30; the voltage contrast data displayed on the display as recited in claim 32; means

for applying an electron beam of relatively low energy relative to the structure to negatively charge electrically floating portions of the structure as recited in claim 33; means for applying charge to a predetermined region of the wafer. means for probing a portion of a predetermined region of a die to obtain voltage contrast data for the structures, and means for applying charge to the predetermined region at a significantly lower resolution than the resolution at which the region is probed as recited in claims 35 and 44; means for scanning a charge particle beam across the predetermined region in a series of scan lines as recited in claims 38 and 49; a voltage contrast image of the portion of the region as recited in claim 40; an image of reference voltages as recited in claim 41; means for determining reference voltages for such structure as recited in claim 44; and a wafer having some structures at a ground voltage and other structures at a floating voltage relative to ground as recited in claim 49 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

4) ***Rejection Under 35 U.S.C. 112, Second Paragraph***

Claims 44-51 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 44 is indefinite for respectively reciting the limitations "means for determining ... non-defective" and "means for analyzing ...defective" in lines 9-10 and lines 11-13. What are the means and/or elements that should they be charged and be non-defective? How are the voltage contrast data analyzed to detect structures at voltages different from the reference voltage for

such structures?

Claim 49 is indefinite for reciting the limitation "for that ... non-defective" in lines 9-10.

How should the structure be charged and non-defective?

Claim 51 recites the limitation "the electron beam probe" in line 2. There is insufficient antecedent basis for this limitation in the claim.

5) ***Rejection Under 35 U.S.C. 112, First Paragraph***

Claims 9-51 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The specification is completely silent for representing the added limitations "applying an electric field perpendicular to a surface of the structure ... analyzing the data to determine the functionality of the element" as recited in parts b), c), and d) of claim 9; "the electron beam floods an area of the structure, which encompasses the element with electrons" as recited in claim 12; "using the electron beam to apply a focused beam of electrons to the element" as recited in claim 13; "a plate for positioning the structure and the voltage applied between the electrode and the plate" as recited in claim 15; "applying the electric field so as to charge the element with a negative potential" as recited in claim 16; "detecting resulting secondary electrons so as to obtain voltage contrast data" as recited in claim 17; "obtaining the voltage contrast data in the form of an image" as recited in claim 18; "controlling the temperature of the structure during the test" as

recited in claim 20: "an electric field generator ... the charge particle beam" as recited in parts b), c) and d) of claim 21; "a grid electrode" as recited in claim 25; "a sample plate ... the sample plate" as recited in claim 27; "the electrode ... of charging" as recited in claim 29; "the voltage can be varied to determine the potential and polarity of the charge applied to the element" as recited in claim 30; "a display which displays the voltage contrast data" as recited in claim 32; "applying an electron beam ... determine the functionality of the structure" as recited in parts a), b), and c) of claim 33; "the electron beam ... 20 V relative to the semiconductor structure" as recited in claim 34; "applying charge ... at which the region is probed" as recited in parts a), b) and c) of claim 35; "flooding the predetermined region with relatively low energy electrons" as recited in claim 36; "the flooding step ... a single step" as recited in claim 37; "scanning a charge particle beam ... the structures" as recited in claim 38; "obtaining a voltage contrast image of the portion of the region" as recited in claim 40; "comparing the voltage ... the reference voltages" as recited in claim 41; "comparing the voltage ... the images" as recited in claim 42; "repetitions of steps ... the wafer" as recited in claim 43; "means for applying charge ... are defective" as recited in parts a), b), c) and d) of claim 44; "means for analyzing voltage contrast data compares ... of another device" as recited in claim 48; "a semiconductor wafer, having ... defective structures" as recited claim 49; and "the means for analyzing ... there between" as recited in claim 50.

Applicant is requested to indicate all the above-limitations which are disclosed in the specification. Additional explanations are needed if applicant insists on including these limitations without the introduction of new matter which is required.

6) Claims 9-51 of this application have been copied from U.S. Applications No. 08/892,734, 08/782,740 and 09/012,277 for the purpose of an interference.

Applicant has failed to specifically apply each limitation or element of each of the copied claim(s) to the disclosure of the application.

Applicant is required to specifically apply each limitation or element of each of the copied claim(s) to the disclosure of the application.

7) For the above stated rejections/reasons, the interference will not be set up at this time as requested.

8) Applicant's arguments filed on April 16, 2002 have been fully considered but they are not persuasive.

**A) Applicant argued that:**

1) The original patent or a statement for lost or inaccessible original will file after notice of allowance.

2) The data arranged in an image can be displayed on image display 46 of fig. 1.

3) Figs. 3b-3d show and col. 6, lines 55-58 indicate the means for controlling the temperature of the structure during the test.

4) The electrode 107 in figs. 4 and 12 can function as a grid electrode.

5) Fig. 4 shows the sample plate 20 and the voltage power supply 114 connected to the sample plate 20.

6) Col. 9, lines 46-51 and col. 12, lines 51-55; Abstract, lines 4-7 and col. 8, lines 2-5;

and col. 22, line 16-et seq., and figs. 13-18 respectively disclose the limitations in parts b), c) and d) of claim 9.

7) Col. 12, line 66- col. 13, line 3 disclose the limitation as recited in claim 16.

8) Applicant states that the specification discloses detecting resulting secondary electrons so as to obtain voltage contrast data as recited in claim 17.

9) Col. 4, lines 55-57 and col. 8, lines 2-24 disclose the voltage contrast data in the form of an image as recited in claims 18 and 40.

10) Col. 6, lines 55-58 discloses the means for controlling the temperature of the structure during the test as recited in claim 20.

11) Col. 9, lines 46-51; col. 12, lines 51-et seq.; col. 9 line 19-col. 14, line 14; and fig. 4 disclose the limitations as recited in parts b) and d) of claim 21.

12) Figs. 1, 4, 7, 8 and 12; and col. 4, lines 64-66 disclose the sample plate (stage 24) and power supplies 115 and 111.

13) Col. 9, lines 46-51 discloses the limitation as recited in claim 29.

14) Col. 12, line 4-et seq. discloses the limitation as recited in claim 30.

15) Col. 8, lines 2-24 discloses a display 46 and/or 38 for displaying the voltage contrast data.

16) Col. 12, lines 4-et seq.; Abstract, lines 4-7; col. 8, lines 2-5; col. 22, line 16-et seq.; and col. 4, lines 55-57 disclose the limitations as recited in parts a), b) and c) of claim 33.

17) Col. 12, lines 50-60 disclose the limitation as recited in claim 34.



18) Figs. 2-5; Abstract, lines 4-7; and col. 4, lines 55-57 disclose the limitations as recited in parts b) and c) of claim 35.

19) Fig. 1; and col. 14 line 15-et seq. disclose the limitations as recited in parts b) and c) of claim 44.

20) Fig. 3a; and col. 4, lines 55-63 disclose the limitation as recited in claim 48.

21) Fig. 5; and col. 4, lines 54-57 disclose the limitations as recited in claim 49.

**B) This argument is not persuasive because:**

1) The notice of allowance can not issue without the original patent or a statement for lost or inaccessible original.

2) The image display 46 of fig. 1 does not show the voltage contrast data in the form of an image.

3) Figs. 3b-3d does not show the means for controlling the temperature of the structure during the test but deflecting the charged particle beam.

4) It is noted that the electrode and the grid electrode are different.

5) Fig. 4 does not show the sample plate 20 and the voltage power supply 114 connected to the sample plate 20.

6) Col. 9, lines 46-51 and col. 12, lines 51-55; Abstract, lines 4-7 and col. 8, lines 2-5; and col. 22, line 16-et seq., and figs. 13-18 does not disclose respectively the limitations in parts b), c) and d) of claim 9 as applicant argued.

7) Col. 12, line 66- col. 13, line 3 does not disclose an electric field applied to change

the element with a negative potential as recited in claim 16 as applicant argued.

8) Applicant does not point out where the specification discloses detecting resulting secondary electrons so as to obtain voltage contrast data as recited in claim 17.

9) Col. 4, lines 55-57 and/or col. 8, lines 2-24 does not disclose the voltage contrast data in the form of an image as recited in claims 18 and 40 as applicant argued.

10) Col. 6, lines 55-58 does not disclose the means for controlling the temperature of the structure during the test as recited in claim 20 as applicant argued.

11) Col. 9, lines 46-51; col. 12, lines 51-et seq.; col. 9 line 19-col. 14, line 14; and fig. 4 does not disclose the limitations as recited in parts b) and d) of claim 21 as applicant argued.

12) Figs. 1, 4, 7, 8 and 12; and col. 4, lines 64-66 disclose the sample stage 24 not a sample plate.

13) Col. 9, lines 46-51 is completely silent for reciting the limitation as recited in claim 29.

14) Col. 12, line 4-et seq. is also completely silent for reciting the limitation as recited in claim 30.

15) Col. 8, lines 2-24 discloses an image displayed on a display 46 not the voltage contrast data.

16) Col. 12, lines 4-et seq.; Abstract, lines 4-7; col. 8, lines 2-5; col. 22, line 16-et seq.; and col. 4, lines 55-57 does not disclose the limitations as recited in parts a), b) and c) of claim 33 as applicant argued.

17) Col. 12, lines 50-60 does not disclose an electron beam having an energy being less than 20 V and applied to the structure as recited in claim 34.

18) Figs. 2-5; Abstract, lines 4-7; and col. 4, lines 55-57 does not disclose the limitations as recited in parts b) and c) of claim 35 as applicant argued.

19) Fig. 1; and col. 14 line 15-et seq. does not disclose the limitations as recited in parts b) and c) of claim 44 as applicant argued.

20) Fig. 3a; and col. 4, lines 55-63 does not disclose the limitation as recited in claim 48 as applicant argued.

21) Fig. 5; and col. 4, lines 54-57 does not disclose the limitations as recited in claim 49 as applicant argued.

#### **REMARKS**

For the reasons above, Applicant is requested to point out clearly all the limitations objected under drawings and rejected under 35 U.S.C. 112, first paragraph.

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR

1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner *Kiet T. Nguyen* whose telephone number is (703) 308-4855.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 308-0956. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9319.

*K.T.N/Primary*  
March 24, 2003

*K.T.N*